

Ultrasound Fracture Diagnosis in Space

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Introduction

This ground-based investigation accumulated high-level clinical evidence on the sensitivity and specificity of point of care ultrasound performed by expert and novice users for the rapid diagnosis of musculoskeletal (MSK) injuries. We developed preliminary educational methodologies to provide just-in-time training of novice users by creating multi-media training tools and imaging procedures for non expert operators and evaluated the sensitivity and specificity of non-expert performed musculoskeletal ultrasound to diagnose acute injuries in a Level 1 Trauma Center.

Methods

Patients with potential MSK injuries were identified in the emergency room. A focused MSK ultrasound was performed by expert operators and compared to standard radiographs. A repeat examination was performed by non-expert operators who received a short, just-in-time multimedia education aid. The sensitivity and specificity of the expert and novice ultrasound examinations were compared to gold standard radiography.

Results

Over 800 patients were enrolled in this study. The sensitivity and specificity of expert performed ultrasound exceeded 98% for MSK injuries. Novice operators achieved 97% sensitivity and 99% specificity for targeted examinations with the greatest error in fractures involving the hand and foot.

Conclusion

Point of care ultrasound is a sensitive and specific diagnostic test for MSK injury when performed by experts and just-in-time trained novice operators.